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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/642,371

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Yong Chen

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INTELLECTUAL PROPERTY ADMINISTRATION
FORT COLLINS, CO 80527-2400

EXAMINER

DANIELS, MATTHEW J

ART UNIT

PAPER NUMBER

1791

NOTIFICATION DATE

DELIVERY MODE

05/02/2008

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/642,371	Applicant(s) CHEN ET AL.	
	Examiner MATTHEW J. DANIELS	Art Unit 1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 January 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13, 15-18 and 34-49 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) 1-13, 16-18, 34-44 and 46-48 is/are allowed.
- 6) ☒ Claim(s) 49 is/are rejected.
- 7) ☒ Claim(s) 15 and 45 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. **Claims 15 and 45** are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s). These claims fail to further limit the subject matter of the independent claims on which they depend because their subject matter has already been incorporated by amendment into the independent claims. Therefore, by reciting redundant subject matter, they fail to provide any further limitation not already found in the independent claims.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. **Claim 49** is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The claim recites “without subsequently removing”, but this is not disclosed by the specification as originally filed, and its meaning is unclear since it appears to exclude operations occurring after the claim.

3. **Claim 49** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear what the "single set of nanoscale recesses" is intended to mean. While Figs. 3A-3C could be interpreted as a "set", it is unclear if this limitation is meant to limit the claim to imprinting of four protrusions as a set, or whether it is meant to exclude the mesoscale features of Sasahara by providing a mold consisting essentially of a set of nanoscale protrusions.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Rejections set forth previously under this section are withdrawn in view of the persuasive remarks and the amendments to the claims.

5. **Claim 49** is rejected under 35 U.S.C. 103(a) as being unpatentable over Sasahara (US 2002/0012825) in view of Chou (USPN 5772905) and Jeong (USPN 6943117). **As to Claim 49**, Sasahara provides an article which could be used as an ion exchange membrane, the method comprising:

(a) Providing a mold having a top surface (implicit because the film is embossed).

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(b) Embossing a membrane ([0038], [0039], and [0049]), which would require pressing, to form a nanoscale recesses in the membrane ([0049]), the recess having a bottom and sidewalls extending from the surface to the bottom.

(c) Depositing a layer of catalytic material on the membrane (Par. [0057]), and it is submitted that the catalytic would have reached the bottom of the recess in view of the teaching in [0049] that the additional surface roughness creates an increase in reaction surface area, which would occur only when coated with the catalyst. Additionally, because Sasahara uses the same sputtering process used to deposit the catalytic material in the instant invention, it is submitted that a similar effect (free of catalytic material) would also be produced with respect to the sidewalls.

In this rejection, Sasahara provides a nanoscale pattern shown as item 126 in Fig. 8. However, Sasahara is silent to providing a mold having a top surface by establishing at least one nanoscale masking element on at least a portion of the top surface, etching exposed portions of the mold to form at least one nanoscale protrusion therein, and pressing the nanoscale protrusion into an unpatterned top surface of the membrane to form a single set of nanoscale recesses.

However, these aspects of the invention would have been prima facie obvious over Chou and Jeong for the following reasons:

Jeong teaches providing a mold having nanoscale protrusions (8:2), or a set of such protrusions, formed into a mold by establishing a nanoscale masking element (8:1-2) and etching exposed portions of the mold (8:22). It is noted that the mold of Jeong has two different structures, small nanoscale features and larger grooves produced by a dicing wheel or other means (Fig. 4C), and that Sasahara expressly suggests two different feature sizes and embossing

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(Figures and [0053]). It is submitted that in the combination of Jeong and Sasahara, it would have been obvious to provide an unpatterned top surface of the membrane since the mold of Jeong would provide both the mesoscale channels and the imprints having a smaller scale.

Chou teaches a mold having one or more nanoscale protrusions (Fig. 1A, item 16 and Fig. 2) and pressing into a membrane to form recesses having a lateral dimension of 25 nm (Fig. 1C and Fig. 2), which is interpreted to be “about” 20 nm. Chou also teaches that deposition processes performed on features having sidewalls would obviously leave the sidewalls free of any deposited materials (Fig. 5A). One of ordinary skill would have found it obvious to adjust the dimension of the mold features and recesses produced in order to adjust the amount and surface area of the catalytic material in the recesses. Therefore, it would have been obvious to adjust and optimize the size of the imprinted features to some smaller dimension than the 25 nm disclosed by Chou.

It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to incorporate the methods of Chou and Jeong into that of Sasahara for the following reasons:

a) Sasahara, Chou, and Jeong teach each of the claimed steps. One of ordinary skill could have combined the elements of Chou and Zhang with Sasahara using known methods in view of Sasahara’s teaching of embossing, which would require a mold and a method of making a mold. In the combination, the aspects provided by Jeong and Chou each perform the same function as they did separately, with the predictable result of providing a mold having a nanometer length scale which would increase the surface area of an embossed surface and a second larger length scale for producing the passages required by Sasahara.

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b) Sasahara suggests an embossing process for producing the membrane and increasing the surface area ([0021], [0049], [0062]), and Chou and Jeong provide an embossing process and a method of making a mold for use in an embossing process. A reasonable expectation of success would be implicit in that Chou and Jeong imprint upon a synthetic materials, and Sasahara uses a polymeric film or membrane.

Allowable Subject Matter

6. Claims 1-13, 16-18, 34-44, 46-48 are allowed.

Response to Arguments

7. Applicant's arguments, see pages 8-12 of the remarks filed 9 January 2008 with respect to Claims 1 and 34, in combination with the amendments to those claims, have been fully considered and are persuasive. The rejections of those claims have been withdrawn.

8. Applicant's arguments filed 9 January 2008 with respect to new claim 49 have been fully considered but they are not persuasive. The argument appears to be on the basis that Chou practices a method in which Chou performs a removal process to form circuitry (page 12). However, this argument appears to be drawn to the result, without consideration of the process required to achieve that result. Sasahara provides a sputtering (physical vapor deposition) process, which is noted to be one of the disclosed processes for producing the claimed catalytic material deposits. Chou merely provides evidence that absence of sputtered material on sidewalls of a recess would be expected. For these reasons, it is asserted that the absence of

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catalytic material on the sidewalls is a conventional obvious result in performing sputtering processes.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW J. DANIELS whose telephone number is (571)272-2450. The examiner can normally be reached on Monday - Friday, 8:00 am - 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on (571) 272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Matthew J. Daniels/
Primary Examiner, Art Unit 1791
4/28/08